

REMARKS

Reexamination and reconsideration of this application is requested. Claims 1-2, 4, 6-7, 9-12, 14-17, and 23-24 have been amended, and Claims 5 and 13 have been canceled. After this Response, Claims 1-4, 6-12, and 14-24 remain pending in this application. No new matter was added.

Objections To the Specification

The Examiner requested that the Applicants update the states of all the related applications listed on the first page of the Specification as originally filed. The Applicants have amended the Specification per the Examiner's request. Accordingly, Applicants request that the Examiner withdraw the objection.

Rejections under 35 U.S.C. 112

The Examiner rejected claims 1-8, 17-22, and 24 under 35 U.S.C. § 112, second paragraph stating that claim 1 recites "sending all instruction for the resource to perform an available action" and that "[i]t is not clear if one instruction of multiple instructions is (are) sent for one resource or multiple sources to perform one or multiple available action". However, claim 1, prior to this amendment, recited "modifying resource states, by sending an instruction for the resource to perform an available, in response to determining the autonomic computing system is not at the desired end state". Claim 1 does not recite "all instruction" as asserted by the Examiner. Therefore, the Applicants believe that claim 1 particularly points out and distinctly claims the subject matter of the invention as required by 35 U.S.C. § 112, second paragraph. Accordingly, the Applicants respectfully suggest that this rejection be withdrawn.

With respect to claim 4, the Examiner states that the limitation "sending an instruction for the resource..." is vague because it is not clear to which resource the

instruction is being sent. Therefore, the Applicants have amended claim 4 to more clearly recite "...sending an instruction for at least one resource...." Accordingly, the Applicants respectfully suggest that this rejection has been overcome and should be withdrawn.

With respect to claims 17 and 24, the limitation "the resource harvester" has been deleted and replaced with "the resource monitor" which has proper antecedent basis in the claim. Accordingly, the Applicants respectfully suggest that this rejection has been overcome and should be withdrawn.

Rejections under 35 U.S.C. 101

The Examiner rejected claims 9-16 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. The Applicants have amended claims 9-16 to recite "computer readable storage product. Accordingly, the Applicants respectfully suggest that this rejection has been overcome and should be withdrawn.

Rejections under 35 U.S.C. 102

The Examiner rejected claims 1-25 under 35 U.S.C. § 102(b) as being anticipated by Wolff (U.S. Patent No. 6, 067,545). Wolff is directed towards load balancing a network. Wolff teaches that resource rebalancing includes remapping of pathways between nodes, e.g. servers, and resources, e.g. volumes/file systems. Resource rebalancing, according to Wolff, allows the network to reconfigure itself as components come on-line/off-line, as components fail, and as components fail back.

The presently claimed invention, on the other hand, advantageously overcomes problems with the prior art by specifying relationships in a policy driven autonomic computing system. Policy driven autonomic computing allows the system to handle

complex interdependencies between system resources, provide a reliable detection of status changes, and allow quick automation of failed resources.

In one example, of the presently claimed invention, an administrator is able to define through policy the desired end state of the elements of a system by defining the relationships among the various elements of the system. An administrator specifies policies - what to start, when to start it, how long it should run restrictions on where it should run, relative importance, etc. These statements ideally would be for the business applications that the administrator wants to run - and generally do not deal with how these applications are to be brought up or down by the system.

These elements, or resources, can be software programs, hardware items, or compound resources that allow for arbitrary groupings of resources. The policy specifies how the system as a whole should operate, and the automation services take all of the necessary steps to drive the system towards the end state, reacting to any perturbation of that state or intermediate state as they occur. The policies are not limited to requiring full definition of resources but can also be automatically determined ("harvested") from the resources specified.

A resource may be any physical or logical entity that provides services to other components (e.g., Network adapter, service IP address, application). In a computing system, high availability (HA) is achieved by the automated system meeting a desired end state. Policies are used to describe how to manipulate the resources to keep them in desired end states. The relationship specification which embodies the requirements for meeting a specified end state policy contains generalized definitions of how various resources are grouped, how they relate to one another, and the desired state of the resources in relation to the system and other resources. In addition, the system can cooperate with the underlying operating environment to harvest relationships among classes of resources, and specific resource to resource relationships, in order to simplify the task of the administrator in specifying the policy required.

A user, in one example, is able to specify the interrelations of the resources that support the user's application - in some cases to the complete set, in others only until information can be harvested from that point down. These interrelations are specified through a directed graph of relationships - that determine what depends upon what, which resources can be used to support other resources, what is required to start after or before other resources. This specification of relationships tells the system how the various parts relate so that a failure anywhere along the chain can be handled and so that ordering of start and stop operations can be done correctly.

It is also possible to express some policy here as well (e.g., only this set of resources is to be considered, or to restrict the selection to a subset of nodes in the cluster, etc.). Conditionals can be used to drive recovery or start or stop decisions and priorities can be assigned to allow conflicts to be resolved. The administrator also configures the system by assigning values to resources - such as an IP address to use for the application, or a file path in which to store data. This can be done at the application level, or can be done to specify what should be assigned to a resource, or even to create a given instance of a resource for the application to use.

With respect to claim 1, the Examiner states on page 5 of the present Office Action that Wolff teaches "determining policy definitions for an autonomic computing system (column 2, lines 37-41: pathway between resources; column 12, lines 55-67: resource and connection information). However, the Applicants respectfully disagree. In fact, the Applicants respectfully suggest that throughout the present Office Action the Examiner is improperly broadening the scope of Wolff. In other words, the Examiner is reading Wolff outside the scope of Wolff's teachings.

For example, col. 2, lines 37-41, of Wolff merely teach resource rebalancing. Wolff explicitly teaches that resource balancing includes remapping of pathways between nodes. Wolff also teaches that remapping “allows the network to reconfigure itself as components come on-line/off-line, as components fail, and as components fail back”. This has nothing to do with “determining policy definitions for an autonomic computing system”.

Furthermore, claim 1 has been amended to more clearly recite:

receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state;
discovering a set of implicit relationships associated with at least the set of resources;
determining, in response to the receiving, policy definitions for achieving the desired end state associated with the autonomic computing system based on the set of resource relationships received from the user and the implicit relationships that have been discovered;
monitoring applicable resources for status information;
determining if the autonomic computing system is at [[a]] the desired end state; and
dynamically modifying resource states, by sending an instruction for [[the]] at least one resource to perform an available action based on the policy definitions, in response to determining the autonomic computing system is not at the desired end state.

The above claim element of “determining policy definitions for an autonomic computing system” now recites “determining, in response to the receiving, policy definitions for achieving the desired end state associated with the autonomic computing system based on the set of resource relationships received from the user and the implicit relationships that have been discovered”. Nowhere does Wolff teach or suggest that the policy definitions are for achieving a desired end state that has been received from the user. Even further, nowhere does Wolff teach that the policy definitions are determined based on based on the set of resource relationships received from the user and the implicit relationships that have been discovered. Discovering implicit relationships is beneficial

because a user is not required to explicitly define each and every relationship between resources that can be used to achieve a desired end state. Wolff is completely silent on this claim element, determining implicit relationships associated with a set of resources. Accordingly, the presently claimed invention distinguishes over Wolff for at least these reasons.

The Examiner also states that Wolff teaches “monitoring applicable resources for status information (column 11, lines 40-57: load-balance monitor; column 24, lines 31-50: load-balance monitor); determining if the autonomic computing system is at a desired end state (column 11, lines 40-53: determine if the current I/O utilization has exceeded the configured load-balance utilization threshold); and modifying resource states, by sending all instruction for the resource to perform an available action, in response to determining the autonomic computing system is not at the desired end state (column 13: receiving a command to load-balance the aware-client from a node, redirect future I/O)”.

The load balance monitor of Wolff is a module that “is called upon during the carrying out of physical I/O operations to gather and periodically report load-balancing utilizations statistics. It is responsible for maintaining counters and performing utilization calculations based on total I/O subsystem usage over time”. This has nothing to do with monitoring resources, which are used to achieve the desired outcome specified by a user, for status information. Accordingly, the presently claimed invention distinguishes over Wolff for at least these reasons.

Wolff further does not teach “determining if the autonomic computing system is at the desired end state”. The Examiner states that Wolff teaches this because Wolf states “determine if the current I/O utilization has exceeded the configured load-balance utilization threshold”. The Applicants respectfully remind the Examiner that each claim element needs to be read in light of the other claim elements and dissection of the claim in a piecemeal fashion is improper. In the presently claimed invention, the desired end state is a desired end state for the autonomic computing system as specified by the user such as Application A is to be performed with Application B. Wolff teaches to “determine if the current I/O utilization has exceeded the configured load-balance

utilization threshold". This is not a desired end state as recited for the presently claimed invention. Nowhere does Wolff teach that a desired end state for the autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state is received from the user. Accordingly, the presently claimed invention distinguishes over Wolff for at least these reasons.

Wolff is also silent on "modifying resource states, by sending all instruction for the resource to perform an available action, in response to determining the autonomic computing system is not at the desired end state". The Examiner states that receiving a command to load-balance an aware-client from a node to redirect future I/O. However, claim 1 has been amended to more clearly recite "dynamically modifying resource states, by sending an instruction for at least one resource to perform an available action based on the policy definitions, in response to determining the autonomic computing system is not at the desired end state". The Applicants are assuming that the Examiner is inferring that a desired end state of Wolff is to have load-balancing and is equating this to the presently claimed invention.

However, the Examiner is confusing the presently claimed invention and is improperly reading Wolff. In the presently claimed invention, resources are performing services to achieve the desired end state specified by a user. If the end state is not being achieved, instructions are sent to the resources to perform available actions based on policy definitions that were determined based on the set of resource relationships received from the user and the implicit relationships that have been determined. Nowhere does Wolff teach this. Wolff merely teaches that a command is sent to a load-balance module, which is not the same as the presently claimed invention. Accordingly, the presently claimed invention distinguishes over Wolff for at least these reasons.

As stated above, claim 1 has been amended to further recite "receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state; discovering a set of implicit relationships associated with at least the set of resources..." This language is similar to the language in claim 5, which has been

cancelled. The Examiner states that Wolff teaches “determining a user-defined system end state (column 62, line 50-column 64, line 9: GUI for use to select and alternate); and determining a set of user-defined resource relationships (column 66, line 29-column 67, line 15: user/client display and control).

Col. 62, line 50, to col. 64, line 9, of Wolff merely states that a GUI allows a user to select a specific volume with respect to which the user has read privileges and to request that those privileges be altered to write privileges. Col. 66, line 29, to col. 67, line 15, merely states that a client with read only access can have the option of having their cached directory copies periodically refreshed when other clients make changes to the volume.

The Applicants cannot understand where the Examiner sees that Wolff teaches “determining a user-defined system end state and determining a set of user-defined resource relationships. These citations, nor anywhere else in Wolff teach the amended language of “receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state”. Nowhere does Wolff teach that a user specifies a set of resource relationships associated with a set of resources for accomplishing the desired end state. Accordingly, the presently claimed invention distinguishes over Wolff for at least these reasons.

With respect to the claim element of “discovering a set of implicit relationships associated with at least the set of resources”. Wolff is also completely silent on this element as well. Wolff does not even mention discovering any types of relationships between resources. Claim 6, further defines this element and states that the “discovering a set of implicit relationships further comprises: real-time harvesting of implicit relationships between resources through self discovery. The Examiner states that Wolff teaches this element at column 55, lines 23-56, where Wolff teaches that a “device driver is used in discovery process”. This has nothing to do with real-time harvesting of implicit relationships between resources through self discovery”. For example, a user

specifies “a set of resource relationships associated with a set of resources for accomplishing the desired end state” such as Resource A --> dependsOn Resource B. Resource A --> isCollocated with Resource C, etc. Then implicit relationships (not defined by the user) are discovered such as Resource C --> dependsOn Resource D, and Resource D --> isLocated on Node 256, and Node 257 of a cluster. Nowhere does Wolff teach this. Accordingly, the presently claimed invention distinguishes over Wolff for at least these reasons.

As can be seen, Wolff does not teach “receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state; discovering a set of implicit relationships associated with at least the set of resources; determining, in response to the receiving, policy definitions for achieving the desired end state associated with the autonomic computing system based on the set of resource relationships received from the user and the implicit relationships that have been discovered; monitoring applicable resources for status information; determining if the autonomic computing system is at the desired end state; and dynamically modifying resource states, by sending an instruction for at least one resource to perform an available action based on the policy definitions, in response to determining the autonomic computing system is not at the desired end state.”

Independent claims 9, 17, and 23-24 recite similar to independent claim 1. Therefore, the remarks and arguments made above with respect to claim 1 are also applicable in support of the allowance of claims 9, 17, and 23-24, and for all the dependent claims depending therefrom, respectively, and will not be repeated.

The Applicants respectfully remind the Examiner that a proper rejection under 35 U.S.C. § 102(b) requires that a single reference teach (i.e., identically describe) each and

every element of the rejected claims, which Wolff clearly does not do.¹ Accordingly, the present invention distinguishes over Wolff for at least this reason as well.

Therefore, in view of the foregoing remarks, Applicants believe that the rejection of Claims 1-24 under 35 U.S.C. § 102(b) has been overcome. Claims 1-4, 6-8, 10-12, 14-16, and 18-22 depend from claims 1, 9, and 17, respectively. Since dependent claims include all of the limitations of their independent claim, claims 1-4, 6-8, 10-12, 14-16, and 18-22 also recite in allowable form. Accordingly, the Applicants request that the Examiner withdraw the rejection and allow Claims 1-4, 6-12, and 14-24.

Prior Art Made Of Record But Not Relied Upon

The Applicants have reviewed the references made of record but not relied upon and respectfully submit that each of these references either alone, or in any combination, or in any combination with Wolff, do not teach or suggest the presently claimed invention.

Conclusion

The foregoing is submitted as a full and complete response to the Official Action mailed May 14, 2007 and it is suggested that Claims 1-24 are in condition for allowance. Reconsideration of the rejection is requested. Allowance of Claims 1-4, 6-12, and 14-24, is earnestly solicited.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing

¹ See MPEP §2131 (Emphasis Added) "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim."

the scope of any claim, unless Applicant has argued herein that such amendment was made to distinguish over a particular reference or combination of references.

Applicants acknowledge the continuing duty of candor and good faith to disclose information known to be material to the examination of this application. In accordance with 37 CFR § 1.56, all such information is dutifully made of record. The foreseeable equivalents of any territory surrendered by amendment are limited to the territory taught by the information of record. No other territory afforded by the doctrine of equivalents is knowingly surrendered and everything else is unforeseeable at the time of this Response by the Applicants and attorneys.

If the Examiner believes that there are any informalities that can be corrected by Examiner's amendment, or that in any way it would help expedite the prosecution of the patent application, a telephone call to the undersigned at (561) 989-9811 is respectfully solicited.

The present application, after entry of this Response, comprises twenty-two (22) claims, including five (5) independent claims. Applicants have previously paid for twenty-four (24) claims including five (5) independent claims. Applicants, therefore, believe that an additional fee for claims amendment is currently not due.

However, a petition for extension of time to timely file this response is hereby incorporated by reference herein. The Commissioner is authorized to charge the appropriate petition fee to avoid this application becoming abandoned to Deposit Account **50-1556**.

The Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account **50-1556**

In view of the preceding discussion, it is submitted that the claims are in condition for allowance. Reconsideration and re-examination is requested.

Respectfully submitted,

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